best ways to achieve the commonly accepted goals of health care delivery. To that end, consider the following:

- How clearly should the role of nurse practitioners be defined? How do licensing agencies and health delivery systems weigh the extent of past and continuing educational experience and scrutiny of ongoing peer review activities to determine the scope of allowable practice (including prescriptive authority?)
- Where does cost accountability lie? In capitated systems, should nurse practitioners and physicians participate equally in both reimbursement schemes and financial risk?
- To what extent is physician supervision and support necessary for specific aspects of nurse practice? How can medical education better equip physicians and nurse practitioners to work compatibly? When litigation occurs, how is professional liability apportioned?
- Are the purported cost savings real? How do physicians and nurse practitioners differ in their use of diagnostic testing and prescribing practices? How do differing approaches affect the rapidity of definitive diagnosis, specific therapy, and ultimate outcome? Will the drive to equalize salaries for equivalent work diminish the savings over time, as it has in some specialty areas? Will the application of overtime and other special pay that is usually afforded nursing staff, but not physicians, ultimately offset anticipated savings? If the role of nurse practitioners in independent practice increases, will there be attendant costs associated with professional liability insurance and licensing boards? When physician support through telephone consultation, standardized procedure, and other oversight is required, to what extent will it be compensated financially, and how will overall cost be affected?
- Will nurse practitioners as a group embrace underserved areas, or will they, like physicians, reject the relative professional isolation and lifestyle factors? According to Anderson and associates' data, only 10% of surveyed respondents currently practice in rural settings. Will nurse practitioners readily assume 24-hour responsibility for primary care patients in underserved areas, or will additional workforce and costs be necessary for comprehensive coverage? Should the model of health care delivery in rural settings differ fundamentally from that offered in urban and suburban settings?
- How is quality of care best measured, and should such measures be applied to physicians and nurse practitioners alike?

The United States' health care delivery system is entering an era with increased emphasis on universal access to basic services and greater restraint in the application of highly technologic care. The concept of quality is being considered in the context of overall resources to society in a reasonable balance with patient desires, available technology, anticipated outcomes of treatment, and patient satisfaction. Economic forces are in a tremendous state of flux and do not influence all segments of the market or health professions equally. Methods of funding medical education in the future are likely to shift.

Given this unsettled picture, little is to be gained by piecemeal adjustments intended to address the expressed concerns of less than half of those surveyed in a single professional group viewed in isolation. How many similar considerations might be brought to light by other members of the health care team? Although the input of health professionals constitutes an important part of the health care debate, the solution must ultimately take into account all the pieces of a complex puzzle. The current revolution in information management may well offer the necessary tools for analyzing our past and inventing a better future for health care. As more sophisticated data become available, all health professionals will likely need to put aside past assumptions about models of practice and venture into as-yet-undefined relationships for the optimal care of patients.

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Physicians and Nurse Practitioners—Old Conflicts and New Opportunities

THE DRAMATIC CHANGES occurring in the health care industry have exacerbated competition among health professionals, particularly among those who provide the same or similar health care services and who may compete for reimbursement from the same pool of resources. Such competition promises to intensify as health care executives, purchasers, and policymakers continue to wring out excess costs and struggle to improve access and quality.

In their article elsewhere in this issue of the Journal, Arlyss Anderson, MHS, RN, CS, FNP, Catherine Gilliss, DNSc, RN, CS, FAAN, and Laurie Yoder, MN, MPH, RN, CS, FNP, offer some insights into one arena of competition from the perspective of California's nurse practitioners, a growing profession whose scope of practice overlaps into many areas of physician practice.[1] The authors found that nearly half (43%) of California nurse practitioners responding to their survey identified one or more barriers to practice. The article explores four major identified barriers, two of which—restrictions on prescriptive authority and reimbursement—concern Califor-

nia law and public policy. The other two barriers concern the attitudes and knowledge of physicians and the public toward nurse practitioners. The authors conclude that these perceived legal and attitudinal barriers unduly restrict nurse practitioners' ability to provide accessible, competent, and cost-effective primary care.

This article alone does not provide strong enough evidence to change California's laws and public policies. It does, however, add to a substantial body of literature and evidence that has been instrumental in expanding practice authority and guaranteeing direct reimbursement for nurse practitioners across the nation. Furthermore, the authors' findings about perceived interprofessional relations should serve as a call to improve collaboration between physicians and nurses who will increasingly find themselves working together.

Changes in this area of the law have only come after contentious and politically charged battles in state legislatures where scopes of practice are written into statute. "Scopes of practice," a major component of professional regulation crafted to protect the public, describe the authority to practice vested by a state in health professionals and draw boundaries among the individual professions, creating domains of practice control.

Despite some overlap with physicians' scope of practice, nurse practitioners are among many nonphysician professionals arguing that restrictive scopes deny them the right to provide services they are competent to render.[2] In 1995, 300 bills expanding or clarifying scopes of practice and defining reimbursement for nonphysician providers were enacted into law by state legislatures across the country.[3] Legislators who craft scopes of practice must balance regulation's effects on the quality, cost, and accessibility of services with both professional interests and public protection.[4]

Three major arguments are advanced to support the expansion of nurse practitioners' scope of practice. First, studies indicate that within their scope of practice, nurse practitioners provide primary care whose quality is as high as or better than that of physicians.[5(p19),6] Second, economic analysis shows that the failure to use nurse practitioners as fully as possible may result in unnecessary expenditures of between $6.4 and $8.75 billion annually.[7] Finally, in terms of access to care, expanded laws for nurse practitioners are presented as a remedy for the nation's federally designated Health Professions Shortage Areas, geographic areas or populations that have access to fewer than 1 physician per 3,000 persons. This ratio is less than half the ratio recommended under most estimates of requirements for primary care physicians.[8]

Various groups have voiced their opinions about scopes of practice. For example, the Pew Health Professions Commission's Taskforce on Health Care Workforce Regulation maintains that unreasonable legal barriers to nurse practitioner practice unduly restrict the public's choice to a limited number of health professionals out of a larger pool of those who are competent to provide particular services.[9] Other arguments in support of expanded practice and reimbursement include balancing professional and gender equity.

The strongest challenges to the expansion of nurse practitioners' scope of practice rely on questions about the adequacy of knowledge and training, the quality of care delivered, and the overall competence of nurse practitioners. The argument made in favor of using nurse practitioners to remedy primary care access is debated on the grounds that it remains to be seen whether nurse practitioners would respond to the elimination of practice barriers by relocating in California's underserved areas. Finally, the purported cost savings through expanded nurse practitioner use is also questioned; this is not a well-studied area, and the lower salaries may be offset by increases in other areas (P. D. Jacobson, L. E. Parker, and I. D. Coulter, "Nurse Practitioners and Physician Assistants as Primary Care Providers in Institutional Settings," working paper, RAND Corporation, June 1996).

Legislative trends reveal that blurring the historical practice line between medicine and nursing is increasingly acceptable in many states. States still vary considerably in their laws governing nurse practitioners, however, and along this continuum of laws there are polar extremes. Louisiana, for example, does not allow any prescribing authority, independent practice, or direct reimbursement, whereas Maine allows independent prescribing authority (including of controlled substances), independent practice (after 2 years under supervision), and direct reimbursement for both Medicaid and third-party payers. Legal scholars have questioned this inconsistency in state practice laws.[2]

This wide variation in laws and regulations across the country probably contributes to California's nurse practitioners' negative perceptions of their practice environment. As the authors point out, one study showed that only five states have laws and regulations governing nurse practitioners that are more restrictive than California's.[10]

For example, there is a substantial difference between California and other state laws concerning prescribing authority. With the recent passage of Assembly Bill 1077 by the California Legislature, which expands some aspects of prescribing authority for nurse practitioners, California laws remain more restrictive than those in 23 other states. All of these states allow nurse practitioners to prescribe additional classes of controlled substances under physician supervision, and 14 states allow them to prescribe independently.

Interstate differences in law and policy extend to the direct reimbursement of nurse practitioners as well. In 27 states, third-party insurers are required to reimburse nurse practitioners for covered services. California laws and regulations do not facilitate listing nurse practitioners on health maintenance organizations' (HMOs) provider plans or guarantee direct reimbursement.

The perceived attitudinal barrier to practice—the lack of support from physicians—reported by Anderson and co-workers corroborates other studies that have illuminated the difficult collaboration between physicians and nurses.[11] Health professions schools have been broadly challenged to increase interdisciplinary training as a way

to develop the foundation for good working relationships between physicians and nurse practitioners.[12] Such opportunities would enable both groups of students to learn about one another's knowledge, skills, and perspectives, thus creating a foundation for developing the trust and respect essential to effective collaboration between nurse practitioners and physicians.

There is some reason to be sanguine. The results of a recent study of nurse practitioners and physician assistants providing primary care services in HMOs and multispecialty groups suggest that nurse practitioners and physician assistants in these settings have collegial relationships with physicians (P. D. Jacobson, L. E. Parker, I. D. Coulter, working paper, RAND Corporation).

The article by Anderson and colleagues offers a launching pad for at least three further lines of research that would address the degree to which remaining barriers to nurse practitioner practice in California impede efforts to expand access to care, improve the quality of care, and contain health care costs; the effects of restrictions on prescribing authority and reimbursement on the quality and range of health care services nurse practitioners provide in California; and the perceptions of both physicians and nurse practitioners regarding their evolving practice relationships, regulatory realities, and suggestions for improvement.

As systems move to more integrated and managed arrangements for providing health care, they will inevitably raise more questions about who can provide accessible and high-quality services for the lowest costs. The laws and regulations that health care professionals have used to protect the public and their scopes of practice will face important pressures to transform. The resulting tension will play out not only between nurse practitioners and physicians, but between registered nurses and unlicensed assisted personnel, pharmacists and pharmacist technicians, and dentists and dental hygienists. It is our challenge to make this tension creative.

The best reaction to this from the organized professions would be to understand the perspective and value that each brings to providing care and to agree on the broadest possible arena of shared practice, rather than the narrowest. Ultimately, this must lead to innovative and long-term collaborations in practice and regulation that protect and promote the public's health by the most efficient and rational means possible.

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Parkinson's Disease—A Progress Report

THE SHAKING PALSY described in 1817 by James Parkinson, a general practitioner working in London, is a common neurodegenerative disorder that increases in prevalence with advancing age and is associated with an increased risk of death.[1] It results from the progressive loss of dopaminergic neurons in the substantia nigra of the midbrain, as a consequence of which the striatal concentration of the neurotransmitter dopamine is reduced. Dopaminergic and nondopaminergic cells in other regions are also affected, but loss of the striatonigral projection neurons is the most conspicuous pathologic finding. The cause of this cell loss is obscure. The occurrence of a similar disorder in humans with exposure to 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine suggests that toxic exposure is responsible for Parkinson's disease, but no likely exogenous toxin has been identified. An endogenous toxin may be involved. There is evidence that oxidative stress resulting from the metabolism of dopamine is increased,[2] with the formation of free radicals that lead to DNA damage, lipid peroxidation, and cell death. Dopamine is catabolized by monoamine oxidase to 3,4-dihydroxyphenylacetic acid with the generation of hydrogen peroxide, and this in turn may lead to the generation of hydroxyl free radicals. These radicals may be injurious to dopaminergic neurons if the normal protective mechanisms are impaired. Factors influencing the metabolism and distribution of dopamine may therefore be important in the pathogenesis of the disease[2] and are currently under study. There is no evidence, however, that vitamin E, a scavenger of free radicals, exerts any protective effect in patients with Parkinson's disease when taken in daily doses of 2,000 units, although the extent to which it pen-